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TOTAL CONTROL MECHANISM FOR ACCOUNTING MACHINES

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Fig 1

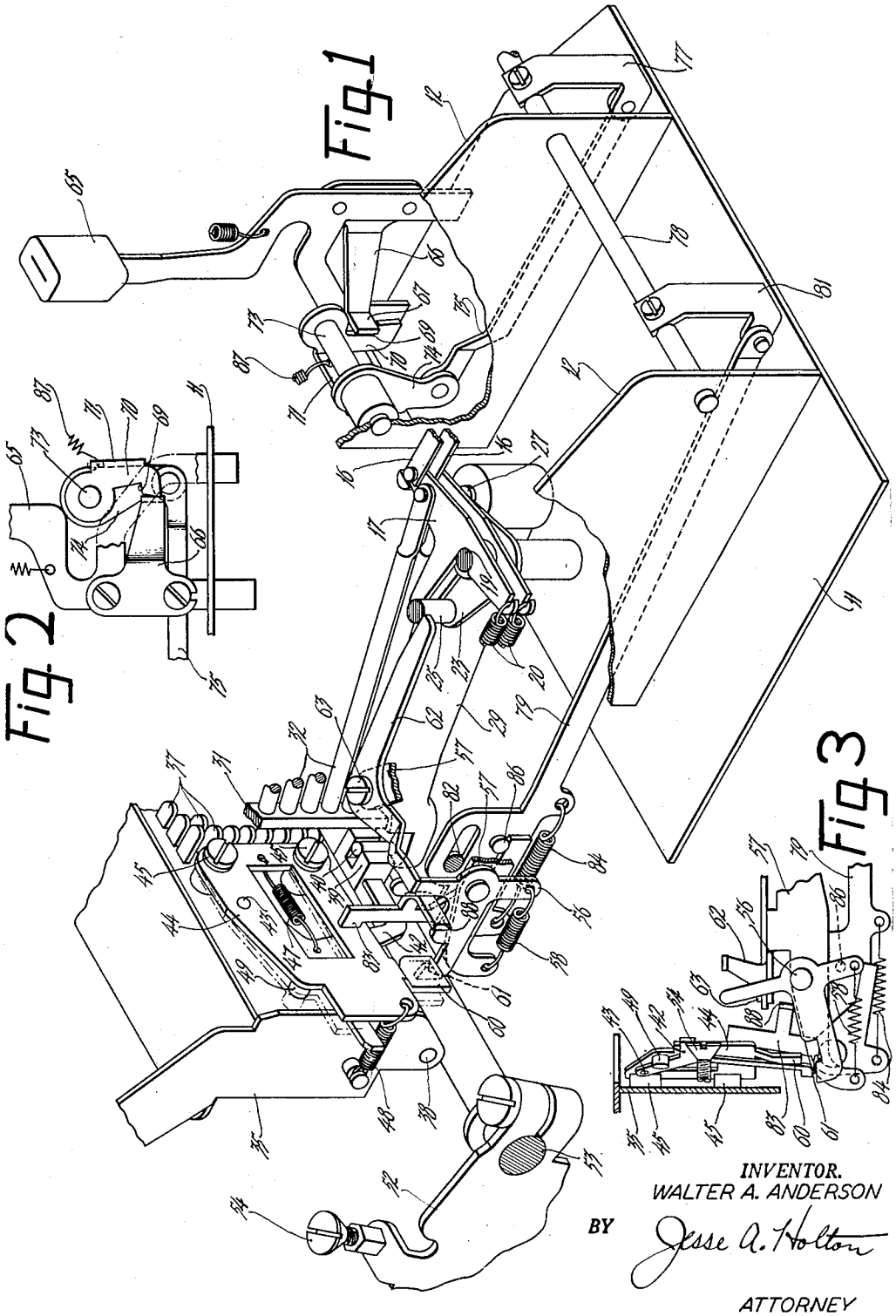


Fig 2

Fig 3

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TOTAL CONTROL MECHANISM FOR ACCOUNTING MACHINES

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3 Claims. (Cl. 235—60.31)

1

This invention relates to a total control mechanism for adding and accounting machines and more particularly to the provision of a total control mechanism which does not alter the touch of the keys of such machine.

The invention is herein described as embodied in the well-known "Underwood Sundstrand" adding machines constructed substantially as shown in the U. S. Patents Nos. 1,583,102 and 1,965,611, issued on May 4, 1926 and July 10, 1934, respectively, to Oscar J. Sundstrand. In machines of this type, a total taking operation, the term total being used herein to designate sub-totals as well as totals and without regard to the positive or negative character of such totals, automatically ensues upon the second blank cycle of the machine and upon every blank cycle thereafter as a result of the positioning of a control element during the first blank cycle. Such a control element must be restored to its ineffective position when a new amount is being indexed for entry into the machine, and in prior machines the depression of any numeral key was utilized to restore such element with the result that the depression of the first numeral key of the keyboard after a total taking operation had been performed required a considerably greater force than any other key operation. Such inequality in the key pressures required to index an amount is undesirable since it tends to slow up the operator of the machine and may lead to incorrect item entry.

One object of the present invention is to provide a total control mechanism which is controlled for restoration by the numeral keys of the keyboard but which imposes no appreciable change in the key pressure required to operate such keys.

Another object of this invention is to provide a means as described which means is reliable in operation, requires no substantial alteration in the associated structures and yet is simple in construction and inexpensive to manufacture.

With these and other objects in view, the invention comprises certain novel features which are hereinafter described with reference to a preferred embodiment shown in the accompanying drawings.

In the drawings—

Figure 1 is an isometric showing of a portion of the amount indexing mechanism of an adding machine showing the invention applied thereto.

Figure 2 is a right side view of a portion of the mechanism to prevent initiation of a total taking operation by the substraction key and

2

Figure 3 is a left side view of the latch and the total control mechanism.

The machine utilized for the present invention includes a keyboard having ten numeral keys, a stationary set of stops cooperative with shiftable entry push rods to enable a denominational amount to be indexed, a shiftable set of pins to sense off the set stops and thus limit the movement of associated type bars, a platen, printing members, a register and racks connected to the type bars to actuate the register. Additional mechanisms include actuating structures for giving the parts their proper motions, and control mechanisms to determine addition and subtraction, total, sub-total and the like operations.

Referring to the drawings, the main machine base, not shown, carries thereon a keyboard frame having a base 11 and two sides 12 fixed to base 11. Ten numeral keys, not shown, are mounted in the keyboard frame and are selectively operable to shift their associated links 16, only two links 16 being shown herein, to the rear. Each link 16 is connected to a separate bell crank 17, all bell cranks 17 being pivoted on a shaft 19 fixed in base 11 and each tensioned clockwise by individual springs 20. Also pivoted on shaft 19 are a pair of similar plates 23, only the bottom plate being shown herein, connected together by a rod 25, a spring, not shown, urging plate 23 clockwise to retain rod 25 against the rearwardly extending tails of bell cranks 17.

Pivoted on a stud 27 in plate 11 is a swinging arm 29 normally urged clockwise and restrained by the usual indexing escapement to move one step clockwise upon each depression of a numeral key of the keyboard. Arm 29 carries at its rearward end a perforated post 31 through which passes a plurality of push rods 32, each connected at its forward end to a key lever 17. Directly behind the post 31 is a stop box frame 35 in which is mounted a plurality of stops 37 settable to an effective rearward position by a push rod 32 upon operation of an associated key. A rod 38 fixed in the side plates of the frame 35, slidably supports a block 39 which is the conventional block to slidably support the sensing members of the type bars, not shown herein, and which is slotted at its forward end to receive a pin 40 fixed in arm 29 to maintain block 39 in the correct position relative to arm 29.

So long as arm 29 and block 39 are in their leftmost positions as shown in Figure 1, that is, so long as no item has been indexed on stops 37, the left side of block 39 contacts a lower arm of a bell crank 42 to hold the left end of

crank 42 in an upper position. Bell crank 42 is pivoted on a stud 43 secured in a plate 44 loosely mounted on a pair of studs 45 secured in frame 35. A spring 47 connected between bell crank 42 and plate 44 urges bell crank 42 in a counterclockwise direction to hold the lower arm of the bell crank against block 39 and, when block 39 is moved to the right as a result of the indexing of an amount, to move the left end of the bell crank to a lower position. A spring 48 connected between the frame 35 and plate 44 urges plate 44 toward the frame 35 into the dotted line position of Figure 1, a stud 49 on the plate contacting frame 35 and limiting the inward movement of plate 44.

Plate 44 is shiftable by the cycling mechanism to a forward position during any blank cycle of the machine, to control the mechanism to take a total on the next cycle if it should be a similar blank cycle as more fully described in U. S. Patent No. 2,308,292, issued January 12, 1943 to Earle Marquess. For such shifting of plate 44, a cam 52 on the main cycling shaft 53 carries an adjustable stud 54. When bell crank 42 is held in its clockwise position by block 39, that is, when no item has been indexed, stud 54 will, at the middle of the machine cycle, contact the left end of bell crank 42 to shift the left end of plate 44 to a forward, total controlling, position. Plate 44 is to be held in such forward position until an item is indexed in pins 37 and for this purpose, there is provided a latch lever 56 pivoted on a fixed bracket 57 and urged clockwise by a spring 58 to hold the rearward arm of latch lever 56 against a projection 60 of plate 44. When plate 44 is moved forwardly by stud 54 as above described, it moves in front of a shoulder 61 on latch lever 56 whereupon spring 58 swings the lever 56 to position the shoulder 61 behind plate 44 and hold the plate in its total controlling position.

Plate 44 is to be released for return to its rearward position and thereby restore the total taking controls, as soon as an item is indexed. A lever 62 pivoted on a stud 63 on bracket 57 has an arm positioned in front of an upwardly extending arm of latch lever 56 and the other arm in contact with the left side of rod 25 on plate 23. When any key lever 17 is rocked by operation of the first numeral key in the indexing of the next amount to be entered, the rear arm of such key lever strikes rod 25 and moves it leftward about shaft 19. Lever 62 is thereby rocked to shift latch lever 56 counterclockwise and withdraw shoulder 61 from plate 44 freeing plate 44 for movement by spring 48 to the rearward position. This function, which is performed by the first numeral key depressed in the restoration of plate 44 to its rearward position, consists in the rocking of lever 62 and latch lever 56 and since spring 58 may be made very light, the performance of such extra function adds only an insignificant amount to the pressure required to normally depress the keys and hence there is no noticeable variation in the touch of the numeral keys.

The above described mechanism is satisfactory in that it equalizes the key touch but it is subject to the disadvantage that if the subtract motor bar is operated after the plate 44 is shifted forwardly, a total would be taken from the subtract side of the register and if the total is a positive amount, this would be inaccurate. To prevent depression of the subtract motor bar or key 65 when plate 44 is in the forward position, a rearwardly extending plate 66 having a bent off ear 67 is secured to key 65 as shown in Figure 2. In the normal upper position of motor bar 65, ear 67 rests in front of and above a shoulder 69 of an arm 70 of a yoke 71 pivotally mounted on a stud 73 fixed in the right hand key frame plate 12. A second arm 74 of yoke 71 is connected by a link 75 to an arm 77 fixed on a shaft 78 journalled in the two key frame side plates 12. A link 79 secured to a second arm 81 on shaft 78 and slidable at its rear end on a fixed stud 82 has pivoted thereon at its rear end, a bell crank 83, a spring 84 connected between link 79 and bell crank 83 urging bell crank 83 counterclockwise, Figure 3, into engagement with a stud 86 on link 79. A spring 87 connected to yoke 71 holds the links 75 and 79 in a rearward position to position an upper arm of bell crank 83 in engagement with the front of plate 44 and holds shoulder 69 from under ear 67 of the subtraction key 65.

When plate 44 is shifted to the total taking position as has been set out, yoke 71 is rocked clockwise, Figure 2, through links 79 and 75 to bring shoulder 69 under ear 67 and thus prevent depression of the subtraction key 65 so long as plate 44 is rocked.

This same mechanism acts in a reverse direction to prevent the latching of plate 44 in a forward position so long as the subtract motor bar 65 is depressed which if permitted would give rise to the same error as set out above. As shown in Figure 2, when the subtraction motor bar 65 is depressed, ear 67 is positioned in front of arm 70 of yoke 71 and so holds the yoke 71, links 75 and 79 and bell crank 83 in their rearward positions. Assuming that a blank cycle is being taken, plate 44 will be moved forwardly by stud 54 at the mid cycle. As link 79 cannot move forwardly while the subtraction key 65 is depressed, spring 84 yields and bell crank 83 is rocked about its pivot on link 79. As a result of such rocking of bell crank 83, a bent off ear 88 of the bell crank contacts a flat surface of the latch lever 56 to the rear of its pivot and rocks the latch lever 56 to the Figure 3 position. In this position of latch lever 56, it cannot hold plate 44 in its forward total taking position. The plate 44 is restored by spring 48 as soon as the stud 54 moves to the rear and no total taking operation can ensue on the next machine cycle.

The above description of a preferred embodiment of my invention is a quite satisfactory mechanism to attain the objects desired but is not to be taken as limiting the scope of the invention as many modifications thereof may be made all coming within the scope of the following claims.

What is claimed is:

1. In an adding machine of the class described having an amount indexing mechanism shiftable from a home position upon the indexing of an amount therein, cycling mechanism, a total taking control mechanism shiftable into an effective position by said cycling mechanism, a spring to move said total taking control mechanism out of said effective position, a member on said total taking control mechanism moved by said indexing mechanism when in home position into the path of operation of said cycling mechanism to shift said total taking control mechanism, a latch to hold said total taking control mechanism in said effective position, a latch release member operated by said indexing mechanism upon the entry of any digit therein to release

said latch, a function control key, a linkage, a blocking member on said function control key to prevent movement of said linkage when said key is in an operated position, and a lever on said linkage, an arm of said lever always engaging said total taking control mechanism and another portion of said lever rocking said latch to an ineffective position with respect to said total taking control mechanism when said total taking control mechanism is shifted while said linkage is blocked by said function control key to thereby prevent retention of said total taking control mechanism in the effective position during operations in which said function control key is operated.

2. In an adding machine of the class described having a cycling mechanism, an amount indexing means having a home position and shiftable therefrom upon the entry of any digit therein, a total taking control member, an arm on said total taking control member, said arm shiftable by said indexing mechanism when in home position into the path of motion of said cycling mechanism to cause movement of said total taking control member into an effective position, resilient means urging said total taking control member to an ineffective position, a latch member to hold said total taking control member in the effective position, a member operated by said indexing mechanism upon the indexing of any digit, a latch release arm between said latch member and said indexing mechanism operated member to release said latch member upon the indexing of the first digit of an amount, a lever engaging said total taking control member, a linkage on which said lever is pivoted, said lever and linkage normally shiftable as a unit by said total taking control member, a function control key, a lock shifted by said linkage into the path of operation of said function control key to prevent operation thereof when said total taking control member is in the effective position, said function control key blocking said lock and its controlling linkage against movement by said

total taking control member when said key is depressed, a yieldable connection between said lever and said linkage to enable movement of said lever by said total taking control member when said linkage is blocked, and an extension on said lever to move said latch member to an ineffective position when said lever is moved on said linkage by said total taking control member.

3. An adding machine of the class described comprising an amount indexing mechanism having a home position and shiftable therefrom upon the indexing of an amount therein, cyclically operating mechanism, a total control member, resilient means to urge said total control member into an ineffective position, a lever on said total control member, said member moved by said indexing mechanism when in home position into the path of operation of said cyclically operating mechanism to enable said cyclic mechanism to shift said total control member into an effective position, a latch to hold said total control member in said effective position, a latch release member operable by said indexing mechanism upon entry of any digit therein, an operable subtraction control key, and a linkage actuated by said total control mechanism when in effective position to latch said subtraction control key in a normal position, said linkage including a member yieldable thereon to release said latch when said total control member is shifted by said cyclically operating mechanism and said linkage is blocked by said subtraction control key in operated position.

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